

Downtime

by Chad

Exit, pursued by a theory

THE pull-the-wings-off-the-butterfly people have been at it again, with all this trying to prove by computer that Shakespeare was the author of a hitherto anonymous (and incidentally second rate) play. After the hallyhoo over the authorship of "The Bonke of St. Thomas More" had died down we were left with established scholars accusing the proponents of the new theory of being sloppy and jumping the gun, while the newcomers in turn complained that they were excluded from publication by vested interests.

I have this awful feeling of having been here before. Years ago a friend of mine tried to turn me on to a book that proved beyond a shadow of a doubt that Shakespeare was all written by Christopher Marlowe. It did this by measuring the average length of words in various plays to 0.3 decimal places, and comparing them. My friend was most scornful when I remained unconvinced — I must be some ignorant savage still to disbelieve after Uncring Science has spoken.

(The theory did, by the way, allow for the fact that Marlowe died half way through Shakespeare's career; Marlowe's murderer was supposed to have been faked to allow him to escape from some enemies. What wasn't allowed, for was the fact that if you read the plays instead of counting the blasted letters you realize that Marlowe and Shakespeare were totally different people.)

Anyway the Marlowe theory is now discredited. I am told, because the mathematics was sound in some way or other. But if that is the case, how can simple souls such as you or I be sure that there isn't a similar error in the latest pronouncements? I am as sceptical as was Diderot about "lies, damned lies, and statistics", and I get very worried about these people who say, "The

Stanley Wells of the Oxford University Press points out other difficulties, such as, the fact that the manuscript of Sir Thomas More is in six different hands, several of whom appear to be thinking the stuff up as they go along — for instance, there are crossings out and so forth. Yet Marlowe says it was all written by one person.

Also, how can you analyse the first words of sentences when Shakespeare never wrote any punctuation? The full stops were put in by the printers.

Wells concludes by saying, "Lots of literary scholars are suspicious of computers." Now that can't be a bad thing.

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Here's some ammunition to fire back at 'poor productivity' critics

SENSITIVE programmers must find themselves on the brink of paranoia as more and more people stand up at conferences and berate them for their poor productivity. Everything is smaller, faster, better — annual growth rates of 15% to 30% abound in the industry. Everyone is pulling their weight except the poor enlightened programmer, whose productivity is claimed to have risen a mere 3% since 1975 over the past 25 years.

Well, it seems you have an ally at last.

Managers are scarcely able to agree what the product of your labours are, let alone agree on a common way of measuring productivity. That is the view of Thore Thoresen, of the New York consultancy Applied Computer Techniques.

Speaking at the Online Future Systems Forum in London, Thoresen chose to define the product as source code, object code, JCL procedure and documentation.

"But there are no standards by which to quantify productivity. By convention, the size of a program is measured in number of lines of source code. The punched card is dead, but its ghost will linger on for many years yet. Again, sometimes numbers of lines of code and numbers of statements are interchangeable, sometimes they are not."

"Other people, though, say that object code is a better measure and they count it in bytes, but the amount of object code produced is a function of the number of variables such as the quality of the compiler and the individual quirks of the programmer."

"So we have a number of ways of measuring the size of a program. What about cost?"

Puzzler



Programmers even more in demand in 80s

ALL the signs are there, far from being fuelled or made redundant by development in the micro field and by easy-to-use software, programmers will be in demand in only 18 moves, with the figures running in correctly 1 to 4 order clockwise around a blank central square.

"A 'move' must consist of sliding one block into whichever square happens to be vacant at the time. Lifting a block out of the frame before replacing it is not allowed. See page 87 for solution."

"We tend to use man-months as a measure of cost. But other factors such as computer time contribute to costs and are variables. And when you choose to measure productivity in number of lines of code per man-month there is disagreement as to what constitutes a line. Some organisations count the blank lines, others put in for elegance, others do not. Some count macros as lines, others wait for the macro to be expanded before counting. Man-month accounting practices vary from organisation to organisation."

"So, by default, the industry has arrived at a measure of productivity which involves dividing one very fuzzy unit of measurement by another. The result is very unreliable indeed," declared Thoresen.

"The best it can do is to give a measure of trends in productivity in a single organisation which has used the same standard of measurement over several years.

"An enormous number of other factors influences productivity: the larger the program, the lower the productivity is likely to be. The more people put on to different parts of the program, the more the productivity is lost in the overhead of people

interaction. Program complexity, choice of access method used affect productivity. There can be an order of magnitude difference between the effort needed for a batch program and an interactive one."

"The performance constraints on the system — fast response times requiring shorter path lengths, the resources constraints, the reliability constraints, all affect productivity."

"Then there is the proficiency of the individual programmer, affected by intellect, motivation, experience. Are there any development tools available? Are they any good?"

'Our best hope lies in Ada'

THORE THORESEN presented the forum with a charming review of the progress of programming through the ages before outlining some of the methods which have been adopted to create some order out of the chaos of program development.

"In the early days, before 1960, there was very little commercial programming, and the programmer worked at the machine code level, picking up zeros and ones with tweezers and putting them into holes.

"Then came high level languages. It was marvellous. Suddenly anyone could be a programmer — a frustrated housewife. Programming became a sort of folk art."

"But by 1965, corporations became very disenchanted. Nobody knew what software was. It was intangible stuff. They ended up defining it as that which is never delivered on time, is never delivered at the promised cost, and never works when delivered."

"Around about 1970, software engineering appeared on the scene to solve all the problems. It sounded great: the name implied a unified discipline, but in reality it was e-

ven a collection of disjointed techniques, each attacking one aspect of the development process.

"In the beginning, large projects were built in the same way that the Wright Brothers built their aeroplanes. You built the system, pushed it over a cliff, watched it crash and then went back to the drawing board. The top-down development approach which allowed the project to be broken down into pieces that could be tested as you went, appealed to engineers who didn't believe in starting a building with the ceiling. But in fact it is a reasonable approach."

"Then there is the structured walk-through, where the programmer presents his program to his peers, who proceed to tear it to pieces — and that approach can reduce the errors and discrepancies before it goes for testing."

"The chief programmer team approach recognises that in the development process, only a small part is coding, while a lot of it is administrative.

"We have to look at new methods of acquiring software — packages, automatic program generators do exist, but they only fit some applications."

"As for non-procedural languages, Thoresen was very dismissive. 'JCL is non-procedural and it's atrocious' he declared."

"As for natural languages, they are too ambiguous."

"You wouldn't gain much if you replaced Cobol with English: who the hell can write

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OP SPOT

Peter takes up 'too good to miss' opportunity

CAREER progression has always posed a considerable problem for members of the operations fraternity.

So it's good to hear from someone who, after ten years of meeting the demands of the operations department, and working shifts to boot, now has the sort of job where his experience will be put to good use.

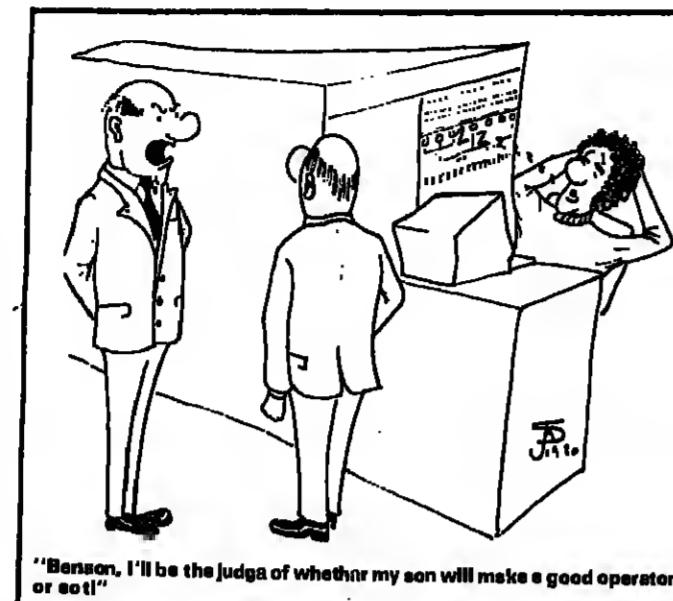
I'm talking about Peter Reddy, who recently took up the position of assistant systems programmer at National Panasonic in Slough, Bucks.

"I've always been quite interested in the education side of things — you know, showing trainees how the system works. But the opportunity of systems programming came up and it was far too good to miss."

National Panasonic has an IBM 370/138, running under DOS. To be a successful systems programmer, Reddy will need an in-depth knowledge of IBM Assembler.

"As yet I don't know any IBM Assembler, so I'll have to put my mind to it and learn the language. I might get a book out of the library for that."

"I do know some RPG, though



How should a manager deal with a disinterested employee?

MANY an operator has to put up with an operations manager who pays too little attention to the career aspirations and training needs of his staff.

When confronted by such a manager, the career-minded operator has the choice of trying to learn and progress in spite of it all, or leaving the installation to seek fame and fortune elsewhere.

But what about the poor manager who cares about his staff, only to be faced by an operator who shows no interest in his work?

Not as uncommon as you might think. If we're to believe what certain people outside the operations fraternity tell us about operators.

The subject of disinterested employees and how managers might deal with them is discussed in a paper from Auerbach, entitled How To Deal With Unsatisfactory Performance.

"Most managers, including data centre operations managers, have at least one employee they would just as soon see find other employment."

He reiterates that the manager must deal with the problem employee with speed and efficiency. Otherwise, he says, it will result in poor morale all round and have a detrimental effect on the service to the user.

through the test, so he got the job.

Reddy found the role of shift leader demanding and enjoyable. And it enabled him to pass his knowledge on to the members of his shift team.

The company sent him on one of Hoskins Education's supervisory courses and he found it very helpful.

"That course did me a lot of good. It gave me the confidence to speak up, put my ideas across, and show people what to do."

The course included giving presentations, learning how to do staff appraisals and dealing with dissatisfied users.

"We had to give a five-minute talk in front of the rest of the class. It was up to us to choose the subject — anything but computers."

The most enjoyable part of the course, in his opinion, involved Reddy and another student assuming the roles of shift leader and head of data control, respectively, and dealing with an unhappy user.

"We were told to sit in a room and wait for someone to come in. All of a sudden this woman was dark when you started at eight in the morning and dark when you finished at eight in the evening. I was glad to get off the eight-hour pattern."

His considerable operations experience includes four years as a shift leader at Johnson and Johnson in Slough.

I liked it at Johnson and Johnson. There was a nice atmosphere about the place and the people were easy to get on with. I tried to get into programming while I was there. I passed the aptitude test, but a graduate applied and failed.

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PEOPLE and EVENTS



We are the Champions

THE ICI Information Processing Team (above) admire the trophies they won in the Business Equipment Trade Association's 7th annual golf tournament, played over 36 holes at Foxhills Golf and Country Club, Ottershaw, Surrey.

Graham Castell (left) holds the trophy donated by the magazine Business Systems and Equipment.

for the best individual score: David Tucker (centre) has the President's Cup, donated by Kardon, which was won by the team, whose third member is Peter Nice.

The tournament was entered by teams from, among others: Facl-Addo, IBM MDS, Nexo, NCR, Honeywell, and Univac.

Pactel MD appointed to Monopolies body

PACTEL's managing director, Holman Hunt, has been appointed to the Monopolies and Mergers Commission.

Hunt has been in the computer industry since 1957, most of the time with P.A. In the 1960s he built up PA's computer business, and in 1970 joined the board of PA Management Consultants, where he was responsible for directing a group of divisions operating in the computer field.

On the formation of Pactel, PA Computers and Telecommunications,

Martin Harding has been appointed marketing manager of Solartron's industrial systems division. Previously he was sales manager. In the same division, Colin Robertson, formerly market specialist for engineering systems, has been promoted to product manager for the same area; he is assisted by Melvyn Harris, sales engineer, who has joined from Racal, where he was installations and commissioning leader on Middle East contracts.

Peter Whitley has been promoted from market specialist to product manager for process plant systems. Eric Pretty, from Bell & Howell, has joined the division as market specialist for power generation con-

tracts. He replaces Mick Snyder, who has the newly-created post of software development manager.

Margaret Mathew, previously with Northern Word Processing marketing, has been appointed market specialist for the same area; she is assisted by Melvyn Harris, sales engineer, who has joined from Racal, where he was installations and commissioning leader on Middle East contracts.

Peter Whitley has been promoted from market specialist to product manager for process plant systems. Eric Pretty, from Bell & Howell, has joined the division as market specialist for power generation con-

tracts. He replaces Mick Snyder, who has the newly-created post of software development manager.

Tony Higgins, acting editor of Computer Weekly, is leaving to join Sperry Univac UK as a consultant dealing with the company's press and publicity activities.

Higgins, who was news editor and deputy editor has been involved with the running and production of Computer Weekly since its inception in 1968, has played a major part in the development and success of the journal which has always been a world leader in the computer industry.

Betty Prince, until lately International memory product marketing manager with Motorola in Austin, Texas, is moving to East Kilbride, Scotland where her title will be memory product marketing manager.

Peter Haines, director of Software Sciences International, has died at the age of 57.

Haines became involved with computer systems in 1954 when he worked on the design and implementation of the Apollo ATC system for the Oceanic area. In 1959 he joined the aerospace consultancy General Precision Systems, and became managing director in 1970.

In 1971 the company merged with Software Sciences and he took the position of marketing director which he held until his death.

Philip Brown has joined the NCC to handle the Cobol aspects of the Standards in Computing programme. Previously, he spent nine years in software engineering at British GEC, and he has lately been chairman of the ECMA technical committee on databases, and a member of ECMA, Codasyl, BSI and ISO Cobol committees.

Nat Wolff has joined X-Data as controller, spares supplies and services. His last job was as repairs controller with DRI.

In the 80's our range and quality of services and products have been strengthened even more, meeting the challenges of changing business situations and fulfilling our clients' needs.

We've grown up a lot in ten years.

From somewhat modest beginnings, we've grown into the largest supplier of computer software based in the U.K. In just ten years we have established twenty centres throughout this country and Europe, now our staff numbers over 1,500 and our turnover's topped 25 million.

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Nominate a Marconi Fellow

NOMINATIONS are invited for the seventh Marconi International Fellowships of £25,000 to be made next year in contribution to communications technology or its applications improving the living standards.

This is intended to include computer-aided design, medical diagnosis and robotics, overcoming handicaps.

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Alan Senler, until now

managing director of Microtronic

and managing director of the composed

of the company's press

and publicity activities.

Tony Kaminski, former vice

manager of Systems Inte

rnational and Computer Vir

assistant display applications

manager, has joined Case

Financing, the IBM brok

ing house, where he is re

sponsible for peripherals

marketing. Kaminski's previous

computers was as a scienti

and the Defence Ministry had

used an Elliott 803 for rese

archival.

FIGURE 1: Microelectronics and computer markets.

his company will do just that; Inmos will be innovative in about 10 years' time.

In Barron's view, US company offshoots set up in the UK do not operate at the front edge of technology, and therefore should not be relied upon as a source of standard integrated circuits. This factor is becoming more important as silicon itself represents increasingly a higher cost factor in microelectronic products.

If Inmos does ever reach the stage of being innovative and developing high-demand products this will benefit both company and country. In the meantime the company is concentrating on production of standard LSI devices such as 16K static RAMs, 64K dynamic RAMs and microprocessors against fierce competition.

When working for Mostek, Schroeder designed a 16K dynamic RAM that was better suited to industry requirements than others already on the market.

Now he believes that the UK should be producing its own integrated

circuits.

So the CPU can concentrate on its main

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MALCOLM PELTU TALKS TO PROF WILKES WHO HAS RETIRED AFTER 34 YEARS AS HEAD OF CAMBRIDGE UNIVERSITY'S COMPUTING LAB

Professor Maurice Wilkes became director of the Cambridge University Mathematical Laboratory in 1946, which became the Computing Laboratory in 1970. Construction on its first computer, EDSAC, began in 1947 and the first automatic calculation was performed in May 1948, with a regular user service beginning in 1950.

In 1951, Professor Wilkes, with Cambridge colleagues David Wheeler and Stanley Gill, published what is now regarded as the first programming book, *The Preparation of Programs for an Electronic Digital Computer*.

He recalls that, at the time, the

publishers, Addison-Wesley in the US, doubted whether there would be a market for a book on the new-fangled programming concept so the terms of the contract were that no royalties would be paid on the first 1,000 sales, double royalties for the next 1,000 and then, normal royalties for further sales. With a sigh, Professor Wilkes recalls that they sold over 2,000.

In 1951 Professor Wilkes also put forward the concept of microprogramming, a phrase he coined, including, he claims, the concept of "bit-slicing" which has now become a major architectural feature of many systems.

In 1952 he presented a paper in Toronto which explored the important distinction between systems and applications programming.

The work of the EDSAC team on programming methodology provided a crucial influence on early software development and computer use.

During the 1960s and 1970s, Professor Wilkes became more interested in questions of systems reliability and distributed processing, which culminated in the development of the Cambridge Ring for which his successor, Roger Needham, received a BCS Award in 1979.

A lifetime of discoveries

NEXT month, Professor Maurice Wilkes will start his latest adventure of discovery. After a lifetime at Cambridge University where he has led a brilliant team into uncharted computing territory, he is moving to the US to do research for Digital Equipment Corp.

The achievements of the Cambridge computing team which he has directed since 1946 represent milestones in computing history and have become an intrinsic part of modern DP life.

Concepts of programming methodology such as subroutine management, debugging aids and even structured program-

ming can trace their roots to work on the first Cambridge computer, EDSAC.

Professor Wilkes himself coined the term "microprogramming" to describe the level beneath the instruction set interface and one of the EDSAC group, Professor David Wheeler who is still at Cambridge, can lay claim to the first operating system routine, a 40-instruction link loader for EDSAC.

More recently, the most important achievement of the Cambridge "Ring", one of the world's leading local networks, which has enormous potential for distributed office information sys-

tems as it allows simple interconnection of a variety of devices along a wideband data highway.

It is interesting that the professor's new employer, DEC, recently joined with Xerox and Intel to develop such local networks, based on the Xerox Ethernet (CW, June 26). At this stage, however, Professor Wilkes said he had not thought about any specific work that he will be doing at DEC as the mechanics of moving to a new laboratory are dominating his mind.

He declined to make any comparisons between Ethernet and the Ring, other than to say that each had its merits and its

limitations. Making theoretical comparisons is not Professor Wilkes' style. As he says, "I have always been a practical man."

His approach to the development of EDSAC illustrates his delight in practical experimentation rather than theory. In fact, Professor Wilkes' contribution to computing is probably best viewed in relation to commercial data processing rather than computing science. He could be seen as one of the first — if not the first — data processing man.

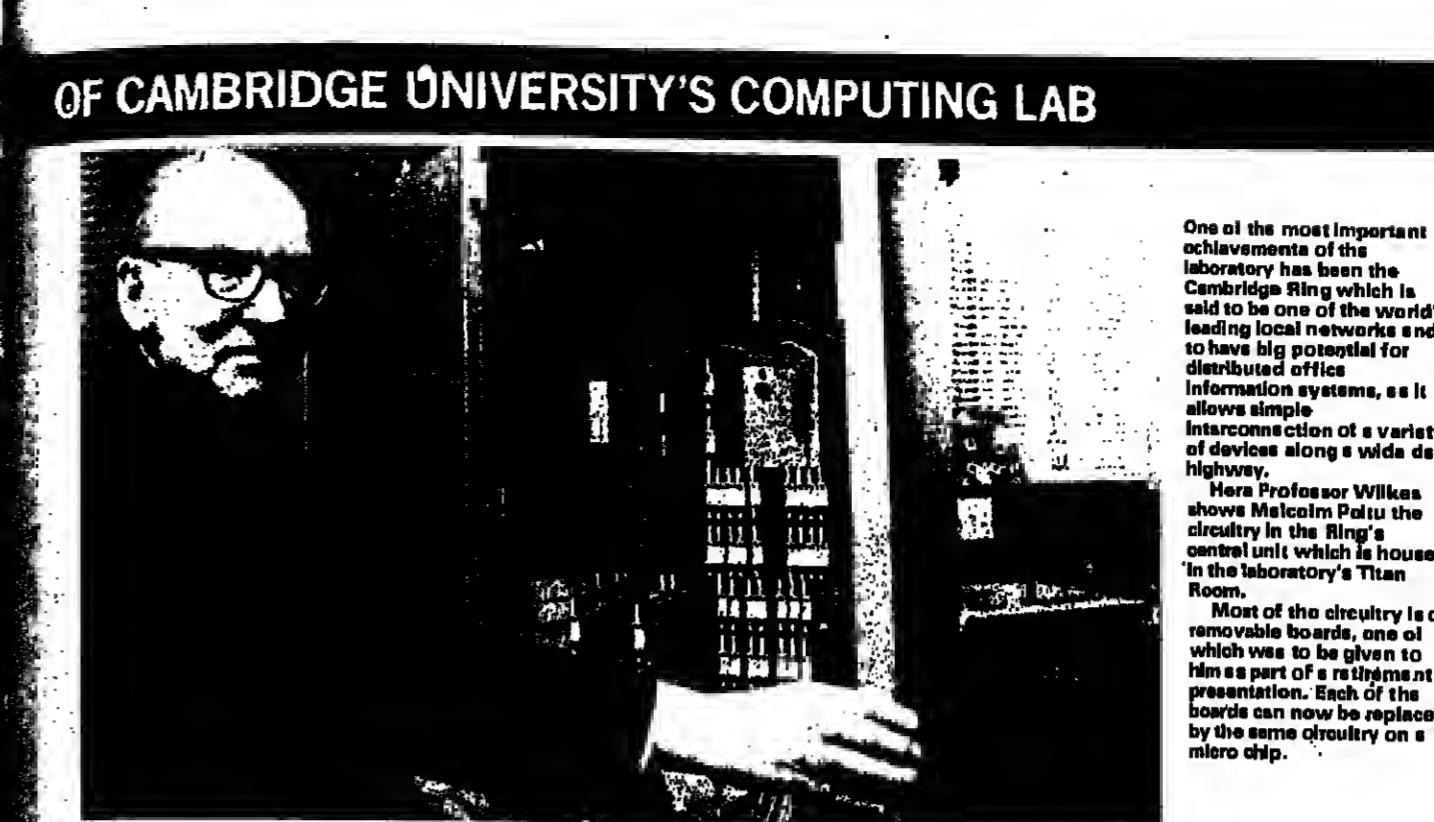
When he established the EDSAC computing service in May 1949 he gave prima consideration to its role in providing a service to users. And he adopted two principles which are still part of any DP manager's credo: be technologically conservative and give priority to good software development methodologies.

The main innovations of EDSAC (Electronic Delay Storage Automatic Calculator) were in its software strategy and nothing new was attempted with the hardware — the memory consisted of five foot long tubes of mercury.

His decision to concentrate on creating a stable program development environment based on systematic design and debugging methodologies, strict documentation standards and ease of user programming may not seem remarkable now.

But at the time, he recalls that programming was dismissed either as a "dogbody task" with little intellectual challenge" or as being of minor significance because programs would be needed to solve only a few problems.

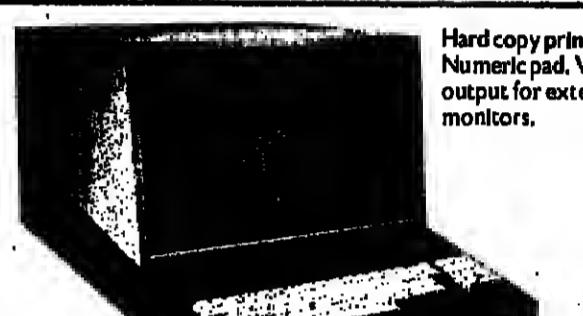
Professor Wheeler — whom Professor Wilkes has described as a "programming genius" — developed the "initial orders"



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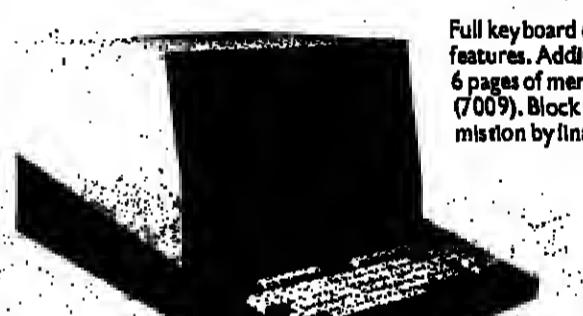
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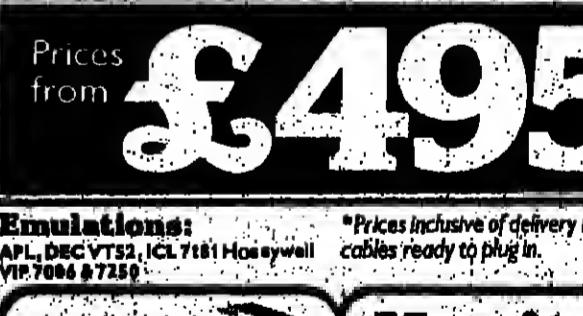
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WILKES — the placing of computing power in the hands of young enthusiasts should be welcomed



thing about the future is its unpredictability.

Yet there can be few moments in DP history which showed such foresight as the time in the early EDSAC days when Professor Wilkes was struck, as if by lightning, with the vision that programmers in the future will spend more time debugging programs than writing them.

Professor Wilkes said that he saw the first online console, which was built by the Project MAC

in the later 1950s, as a

revolutionary

development in

computer

technology. He

spent

more

time

Wilkes said that it was Ecker and Mauchly who really deserved the credit — something which has now been widely recognised.

Professor Wilkes' career as head of the Cambridge Computing Laboratory was interrupted by the war, but he had worked with Leo Rosen

and the team at the Massachusetts Institute of Technology (MIT) when magnetic core memory was tried out for the first time. He recalls the "look of awe" on everyone's faces because it "just worked" and worked reliably.

In 1947, on a summer

holiday at MIT, he saw the first computer, which was built by the Project MAC

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computer

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One of the most important achievements of the laboratory has been the Cambridge Ring which is said to be one of the world's leading local networks and to have been a model for distributed office information systems, as it allows simple interconnection of a variety of devices along a wide data highway.

Here Professor Wilkes shows Malcolm Peltu the circuitry in the Ring's central unit which is housed in the laboratory's Titan Room.

Most of the circuitry is on removable boards, one of which was to be given to him as part of a retirement presentation. Each of the boards can now be replaced by the same circuitry on a micro chip.

Hartree, Professor of Mathematical Physics, chose the subject of automatic computing for his inaugural lecture in 1947 and he kept in close touch with EDSAC developments, primarily as a user.

From the moment of Professor Hartree's declared support, there was no looking back for the EDSAC service. DP managers can, however, look back favourably to the growth of the service because Professor Wilkes recalls that he never had to try to sell the benefits of using it.

"We always had plenty of people wanting to use EDSAC," he said. "At first it was the younger research students who were most keen, but then the interest spread throughout all academic levels."

One of the most significant Cambridge computing innovations had nothing to do with the technology but with the "excellent tea and cakes" which Professor Wilkes, recently being served at regular meetings at the university, held every other Thursday.

Although these tea times seminars attracted not a gathering within the university, the word quickly spread to the other research centres working on computing, most notably at Harwell, Borehamwood and the Royal Signals and Radar Establishment. The Cambridge seminars were a great stimulus to computing in the UK and provided a prime focus for the development of computing in the UK and the rest of the world.

He views personal computing with a special affection because it captures the spirit of amateur exploration which characterised the early days of radio hams.

As a boy, Professor Wilkes was keen on radio. His initial research at the Cavendish Laboratory was in wave propagation and during the Second World War he worked on radar development. But he says that his amateur passion for radio waned when he began to study the subject seriously.

Of the major developments in DP during the last three decades, Professor Wilkes has personal recollections of two: during the 1950s he remembers a presentation of two

of the Massachusetts Institute of Technology (MIT) when magnetic core memory was tried out for the first time. He recalls the "look of awe" on everyone's faces because it "just worked" and worked reliably.

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ADVANCED FILE DESIGN—Part 15

by Owen Hanson and Norman Revell

THIS series has provided the reader with a review of the present state of knowledge in the field of file design. Taken together with Basic File Design, all the principles that a designer requires to optimise file performance have been set out. This is intended to cover the needs of professional data processing staff; however, information at two levels is often used.

The first is a full explanation of the derivation and application of the various principles, with worked examples where necessary. The second is reference to the original sources from which information has been obtained. This concluding article covers these two areas.

The authors have not in the past been able to recommend any single book that covers all aspects of file design. For this reason, Owen Hanson has recently completed a comprehensive text for Pitman's, which will shortly be published under the title *Design of Computer Data Files*. This is intended to act both as a reference and learning text, with a great deal of tabular information to aid design decisions.

The original sources of information given in this series are

Now, read on...

numerous, and for convenience they have been grouped into a number of areas:

Record format and handling

Optimisations of Tape

Operations, by E. S. Walker,

Software Age, Aug/Sept. 1971,

18-17.

Blocking Sequentially Pro-

cessed Magnetic Files, by S. J.

Watera, Computer Journal Vol.

14, No. 2, 105-112.

These papers cover the derivation of theoretical optimum blocking factors on magnetic tape. In practice, an integer solution is required, as blocks of 8.8 records are not generally feasible — although J. Ingila and E. G. Gee discussed the possibility in *Flexibility of Block-length for Magnetic Files*, Computer Journal, Vol. 16, No. 4, 1973, 303-307.

Walker (above) and B. J.

Edwards, in *Choices of Block*

Sizes for Magnetic Tape Files,

Computer Journal, Vol. 20, No.

1, 1977, 10-14, give programs to calculate the optimum blocking factors, Walker in Fortran, and Edwards in Algol. This last provides the optimum Integer

Sequential files

Sectioning of magnetic tape files was discussed in *Basic File Design: The Choice between Magnetic Tape and Magnetic Disc for Sequential File Processing*, by Owen Hanson, appears in the Proceedings, ADV Kongress, March 1980, Vienna. This provides the detail on which the analysis given in the series was based.

Statistical Searching of Sequential Disc Files, also by Owen Hanson, is a City University Business School Working Paper available from the Library, CUBS, 23 Goswell Road, London, EC1M 7BB.

Direct files

Addressing algorithms have been discussed by many writers.

Key-to-Address Techniques: a

Fundamental Performance

Study on Large Existing For-

matted Files, by V. Y. Lum,

D.S.T. Yuen and M. Dodd, CACM, Vol. 14, No. 4, April 1971, 228-239, investigates randomisation applied to eight large files. Karmann, in *Structured Information Files*, published by Melville Publishing Corp, 1973, got rather different results in examining a single large file.

A Practitioner's Guide to Ad-

ressing Algorithms by D.

Severance and R. Duhne, CACM, Vol. 19, No. 6, June 1976, 314-328, looked at the whole field of algorithms once more. The results of these studies differ, and they have been assessed and used in this series to give an overall view of randomisation.

Many of the same references have examined methods of minimising the effect of synonymy once a suitable algorithm has been chosen.

Other sources in this area are

Handling Overflows in Direct

Files by Owen Hanson, Proc 8th

Australian Computer Con-

ference, Canberra, 1978, Vol. 2,

862-880; An Indirect Chaining

Method for Addressing on

Secondary Keys by L. R. John-

son, CACM, Vol. 14, No. 5, 1981,

218-222; Improving the

Efficiency of Randomly Orga-

nised Files by Loading in Access

Frequency Order by Owen Han-

son, CUBS Working Paper No. 7,

available from the CUBS Libra-

rian as above. Between them,

these sources will provide the

reader with a very full coverage

of direct files.

Indexed sequential files

The main sources of information here are: File Organisation and Evaluation Modelling System (FORE) by V. Y. Lum

and P. J. Owans. See Information Systems, Coles IV, Plenum,

New York, 377-387 and earlier

references.

They describe optimisation

techniques.

Quantitative File Evaluation

and Design, by A. Y. Mont-

gomery and D. Hubbard, Proc.

8th Australian Computer Con-

ference, Canberra, 1978, Vol. 3,

1242-1268. This paper, and earlier

work by the authors, compares IBM and ICL 1900 series

software.

Modelling of Indexed Sequenti-

al Files: Monitoring Disc

Transfers by Eva Huzan, Com-

puter Journal, Vol. 22, No. 1, Feb.

1978, analyses the operation of

ICL 1900 series software in de-

tail.

The Hidden Speed of ISAM by

F. T. Coyle, Datamation, June

1971, 48-49, describes how to

optimise ISAM files.

Choice between file organisations

Choosing Between Sequenti-

al and Indexed Sequentially

Organised Files for Sequential

Processing by Owen Hanson,

Proc. 8th NZ Computer Con-

ference, Auckland, Aug. 1978,

Vol. 2, 136-155.

Entry to the File Random or Index by R. A. Kalmus, Data Processing Magazine, Paris 1986 Vol. 8, No. 12, 18-21. Paris 1986 Vol. 10, No. 12, 24-27.

Direct or Indexed Sequen-

tial by a File Designer's Guide by

Owen Hanson, Proc. 8th NZ

Computer Conference, Auckland

1978, Vol. 1, 517-532.

Indexed Sequential File by

G. M. Nijssen, IAC Journal

Vol. 4, No. 1, 1971, 27-37. This paper concentrates on the updating of the two types of the others cover's wider field.

Database systems

There are many references in

this area and a number of books

are suitable see sources. Three

of the most useful are:

Fundamentals of Database

Systems by Dosen, published by

Macmillan.

Computer Database Organisa-

tion, and Principles of Data

Management both by

James Martin, published by

Prindle-Hall. Specific areas of

interest are covered in Practical

Aspects of Database Systems by

Norman Revell, Proc. 10th

ICCA Conference, Bangkok, 1979,

and The Impact of Implementing

Database Systems in Organisa-

tions, by Jerry Sharpen and

Owen Hanson, 8th Australian Com-

puter Conference, Canberra,

1978, Vol. 4, 1612-1628.

Online systems

The most comprehensive

reference here is Design of

Real-Time Computer Systems

by James Martin, published by

Prentice-Hall. Other papers are

made in Parallel Programming

by Tom Gilb, Datamation, Oct.

1974, and A Survey of Studies

of Online Systems in the UK by

Norman Revell, Proc. 10th

ICCA Conference, Vienna, 1978, 367-401.

Security

A very useful

reference

giving a wide

coverage

of advanced file

security is

Keeping

Computers Under Control

edited by Andrew Chamberlain and Owen Hanson, published by Gae & Co. The papers that make up the book reflect most of the major issues for further study.

It should be emphasised

more that most readers will not

require the great bulk of their

references, since the papers

provide a complete coverage of

file design for the DP professional.

The

Hidden

Speed of ISAM by

F. T. Coyle, Datamation, June

1971, 48-49, describes how to

optimise ISAM files.

Choice between file organisations

Choosing Between Sequenti-

al and Indexed Sequentially

Organised Files for Sequential

Processing by Owen Hanson,

Proc. 8th NZ Computer Con-

ference, Auckland, Aug. 1978,

Vol. 2, 136-155.

Index movement

aspects of machine/vehicle inte-

lligence are invited.

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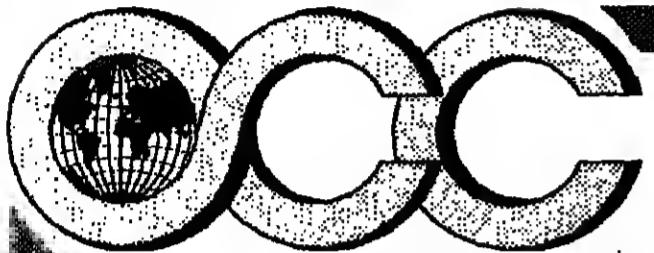
issue will be published in November of that year. Notification of intent to submit a paper, with a tentative title, should be given as soon as possible to Dr. Judith M. S. Prewitt, Director of Computer Research and Technology, National Institute of Standards and Technology, Boulder, Colorado 80303, USA.

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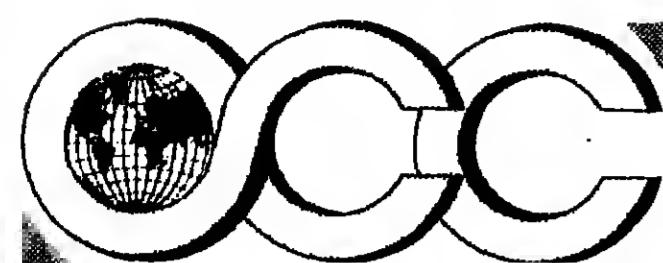
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WORCESTER 1-4 yrs.

OPPORTUNITIES IN HOLLAND

Go Dutch...for the really good life!

PEOPLE who choose or are sent by their company to live and work abroad, find that their new surroundings take some time getting used to. However, the Dutch are used to meeting foreigners, and most of them know one or more foreign language, especially English.

The influx of overseas business to Holland has brought many people from abroad to live there. By and large they have settled down quite happily, and much has been done to make them and their families feel at home.

It is worth looking into the background of the country so as to be a little wiser before going into those lucrative jobs. Holland, otherwise known as the Netherlands, is a small country, but with a population of over 14 million. The population density is the highest in the world. About 8,500,000 people live in Randstad Holland — the western part of the country, where three main cities are situated: Amsterdam, the capital, a seaport and international financial centre; Rotterdam, the largest port in the world (Europe) and Maastricht; and The Hague, the seat of the government and the International Court. The Randstad also takes in Hilversum, Haarlem, Leyden, Delft, Gouda and Utrecht, forming one vast tract of urban concentration.

One of the most important aspects of the world

be worker in Holland from Britain is that it is part of the EEC, so there is no difficulty with work or residency permits.

The economy since the end of the Second World War has been characterised by more or less continuous expansion. In the period 1958-1971 alone, real national income doubled.

Economic policy aims to produce goods in such volume and of such quality that exports, with revenue from service industries and capital transactions, can balance imports.

The main industries are metal manufacturing, electrical, electronic, mechanical, and aeronautical engineering, non-ferrous metals, food, drink, tobacco, oil and chemicals. Data processing personnel can therefore find themselves engaged on just as wide-ranging applications, including production control, order entry, financial and general commercial projects.

In addition, these industries are by and large located

by Val Halliwell



IT'S a good life in Holland — and it can be really good, says Val Halliwell, managing director of Victoria Appointments, the Manchester-based computer personnel recruitment company.

Holland, says Miss Halliwell, has the rich chandeller tradition of the country's 17th Century Golden Age, side by side with buildings displaying wealth, prosperity and progress at every turn.

Dutch DP installations work to high standards, and she reports that working environments are thoughtfully designed, affording a pleasant working atmosphere.

In the western part of the country, with the attraction of its large ports of Rotterdam and Amsterdam, but the rest of the country has its fair share.

The language is Dutch but English is widely used.

Other aspects to consider are, for example, the health facilities in Holland, which are first class. Education is available in private English-speaking schools.

'Taxation' is a separate

issue, and as a prospective full-time employee, should be investigated fully.

Housing in Holland is varied, with new estates developing everywhere which will appeal to permanent employees although, in the main, people prefer to rent accommodation and it is reassuring that rents are controlled. The post and telephone communications are excellent.

Another point is that, being on the mainland of Europe, the rest of Europe (including South of France and sunny Spain) is more easily accessible.

Let us now look at the employment prospects for the would-be DP employee in Holland. There are about 1,800 mainframe installations in the Netherlands with a growing interest in the mini and microprocessor area, although at present the market is largely

dominated by IBM, which has a considerable share of the installations.

As in Britain, there is a shortage of skilled DP professionals, the present emphasis being on programmers with fairly general and varied backgrounds, followed by operators.

The Dutch industry is well represented with software houses, bureaux and manufacturers all vying for business. In addition to a wide range of users, there are programmers who can expect to be engaged on anything from clearing up backlogs of work caused by staff shortages, conversions to new machines, conversions to new software, development of new software for manufacturers, all of which requires a high level of competence, responsibility and reliability for which British DP technicians are recognised as among the best in the world.

A number of conversions to new ranges now in the pipeline will undoubtedly create great opportunities over the next year or so, in

the area of database communications, a growing trend towards distributed processing on minis and mainframes and mini

plus car and expenses

BSO/Automation Technology, a major Dutch software house is looking for professionals with a background in technical, scientific or systems software or hardware to join a growing specialist group. We are looking for people seeking a long-term career in a software and systems house environment rather than a short stay abroad.

We need

Systems designers

to £18k

plus car and expenses

Experience in the design of real-time or control systems based on mini or micro computers. 5 years experience in Automation and a BSc or equivalent are minimum requirements. Knowledge of Assembler is essential. Experience with any of PDP 11, DG Nova or Philips 800 an advantage.

Analysis

to £15k

plus car and expenses

Experience in the development and installation of real-time or control systems based on mini or micro computers. Ability to talk to hardware engineers is important. 3 years experience in Automation and a BSc or equivalent, preferably in computer science or electronics, are minimum requirements. Experience of PDP 11, DG Nova or Philips 800 would be an advantage. Knowledge of Fortran or Basic and Assembler is necessary.

Programmers

to £13k

plus car and expenses

Experience in programming real-time and control systems in Assembler for mini or micro computers. Good design and construction are vital. A minimum of 2 years experience and a BSc are required as is programming experience in Assembler. Experience of PDP 11, DG Nova, Philips 800 or Intel 8080 would be an advantage.

Microprocessor development engineer

to £15k

plus car and expenses

Experience in the development of microprocessor based industrial products or systems with good knowledge of hardware or interfacing problems. 5 years in computing or electronics, ideally with Intel 8080/8085 or Zilog 80 experience. Knowledge of Assembler and at least one high level language is necessary.

The company offers tax free expenses, assistance with medical insurance and a company car covering private use at no cost to the employee. A relocation allowance up to £1,500 depending on family status plus transportation to Holland will be provided. Other excellent benefits and almost 5 weeks vacation. Career opportunities to consultant or project management level are available in a growing company. The company is currently busy on a number of different projects using various hardware, including micros.

Applicants to these unique opportunities are requested to send their detailed résumé, preferably with photograph, to BSO/Automation Technology. Interviews are scheduled to be held in the U.K. during August 1980.

Mail to: BSO/Automation Technology b.v.
Postbox 3059
3502 GB Utrecht
Phone: 010 - 3130946746

OPPORTUNITIES IN HOLLAND

OVERSEAS VIA I.A.

Industrial Artists has more challenging and rewarding staff positions on offer. Below are a selection of our most urgent requirements:

ANALYST PROGRAMMERS with at least three years experience of COBOL on IBM 370, 4300 and 303X Series machines running under OS/VSE, MVS, DOS/VSE and DOS/VG/VS are required to work at a number of client installations. Good commercial application experience will be looked for.

Various locations in The Netherlands.

IBM 370/303X COBOL PROGRAMMER with a minimum of four years experience. Must be able to program UTILISING DL/I1 FACILITIES. The work involves participation in the design and writing of major new systems.

Location: The Netherlands.

4 ICL SYSTEM 10 ASSEMBLER PROGRAMMERS are required to work at client premises in Germany. A good knowledge of commercial applications will be looked for. Training will be given in the use of "STELLA". German language not essential, but advantageous.

UNIVAC 90 SERIES COBOL PROGRAMMER are required with a good knowledge of commercial systems to work on client premises.

SIEMENS BS2000 SERIES SYSTEMS and APPLICATIONS PROGRAMMERS are required to work on various sites in Benelux countries.

ICL 2900 and 1900 PLAN PROGRAMMERS are required for large systems development and optimisation of existing systems. Knowledge of STANDARD ICL UTILITIES is essential.

Location: The Netherlands.

IBM SYSTEM 34 ANALYST PROGRAMMERS with RPG II are required at a number of different sites in The Netherlands.

TEXAV TI 800 PROGRAMMER with a good knowledge of COBOL and ASSEMBLER.

Location: The Netherlands.

PDP II RTT/2 CONSULTANT PROGRAMMER to work in a PROCESS CONTROL environment. Work involves water purification and pumping stations. Knowledge of German advantageous, but not essential.

Location: The Netherlands and Switzerland.

4/6 IDMS/COBOL PROGRAMMERS to work on ICL 2900 Series hardware are required to provide 'in-house' team support on the development of new systems, plus maintenance of existing systems. Applications will include Payroll, Stock Control and Financial Ledgers.

Location: Abu Dhabi.

An excellent benefit package is provided including accommodation, etc.

SYSTEMS PROGRAMMER required to implement a DL/I database, also to create and develop systems software. Hardware: IBM 4300 Series; operating system: DOS/VSE.

Location: The Netherlands.

SYSTEMS PROGRAMMER required to join our client's own permanent staff. Initial task will be to interface DATA 100 and BYCOR terminals to an IBM mainframe. Knowledge of Dutch language essential.

Location: The Netherlands.

UNIVAC V77 COBOL PROGRAMMERS with a knowledge of VORTEX package are required to work on a variety of commercial applications.

Location: The Netherlands.

UNIVAC 11/80 SYSTEMS PROGRAMMER required with a good knowledge of 1100 Series operating systems.

Excellent salaries are on offer, including generous concessions already negotiated with the Dutch taxation authority, four weeks' paid holiday per annum, paid annual holidays and a 40% bonus, plus the full support of the administrative staff based in our Dutch office.

SO PLEASE WRITE OR TELEPHONE NOW:

Ann Arledge,
Marketing and Recruitment Director,
Industrial Artists (Hitchin) Limited

21 Bandrell, Hitchin

Herts SG5 1JW

Tel: (0462) 527412/3 or (0462) 700701 (Eve/Weekends)

IA is a registered Employment Business Operated by D of E

Career opportunities in Holland

BSO/Automation Technology, a major Dutch software house is looking for professionals with a background in technical, scientific or systems software or hardware to join a growing specialist

group. We are looking for people seeking a long-term career in a software and systems house environment rather than a short stay abroad.

We need

Systems designers

to £18k

plus car and expenses

Experience in the design of real-time or control systems based on mini or micro computers. 5 years experience in Automation and a BSc or equivalent are minimum requirements. Knowledge of Assembler is essential. Experience with any of PDP 11, DG Nova or Philips 800 an advantage.

Analysis

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plus car and expenses

Experience in the development and installation of real-time or control systems based on mini or micro computers. Ability to talk to hardware engineers is important. 3 years experience in Automation and a BSc or equivalent, preferably in computer science or electronics, are minimum requirements. Experience of PDP 11, DG Nova, Philips 800 would be an advantage.

Programmers

to £13k

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Mail to: BSO/Automation Technology b.v.
Postbox 3059
3502 GB Utrecht
Phone: 010 - 3130946746

HOLLAND + MUCH MORE

Although our offices are based in Holland, we handle contracts throughout the continent.

The only European country we don't work in is the U.K. So if you want to work abroad come to the agency that offers you more.

Here is a sample of some current and future assignments:

HOLLAND
Operator for Honeywell L86, IBM, DOS/OS, Systems Programmer Honeywell L88

HOLLAND
MINIS FORTRAN Programmer: Honeywell IDS/TDS Analyst/Programmer

GERMANY
IBM Operator DOS/OS

ITALY
IBM Operators: DOS/OS

FRANCE
10 x CICS Cobol Progs. Some French

Total Systems Progs.: Some French

Prime Project Leader: French & English

Prime Prog.: French, unnecessary

FRANCE
OS SYSTEMS PROGRAMMERS

Systems 3/18 CCP Prog.: Some French

PROGS.: RPG/Assembler/Cobol etc.: 2 yrs exp. plus. With some

French: Any machine

FRANCE
CICS Project Leader: 5 years exp.: Some French

DL/I Programmer: Some French

SWITZERLAND
RPG 1.1 & Progs.: Sys/34 Cobol: German useful

SWITZERLAND
RJ/1IMS Programmer: German useful

SWITZERLAND
UNIVAC 11/80 Cobol Programmer: German useful

MANY MANY MORE. There's simply not much room to list them. Don't wait until you're available immediately. Register with us now for jobs in the future. Write or phone (no charges).

EUROPEAN DATA SERVICES

OPPORTUNITIES IN HOLLAND

Victoria Appointments Limited

THE DUTCH CONNECTION

Contractors with at least 4 years experience, preferably gained on IBM machines. We are looking for COBOL programmers/Analysts with DOS/VS or OS experience. CICS DLI desirable. Short or long term contracts available in Holland.

For further information and details, send your CV FREEPOST or telephone Phil Waller now...

061-236 7319 = 061-236 7417.

Victoria Appointments Limited
FREEPOST, Manchester M28BD.
Home No. 061-440 8134.
(24 hour answering service 061-236 7319).

ARE YOU LOOKING FOR A GOOD CONTRACT (OR PERM.) IN HOLLAND? OR WHAT ABOUT GERMANY?

We think we've got what you're looking for... give us a ring, or drop us a line (with C.V.) and we'll see if we can help.

Call Jim Morrison A'dam 258485
or Eric Nixon, A'dam 258664/A'dam 239800

or write to our London Office at:
10 Essex House, George Street, Croydon CR0 1PH

IMS DB/DC PROJECT

Holland **\$20,000 + p.a.**

We are looking for experienced COBOL programmers, analysts and systems designers to develop our on-line inventory control system. The broad functional areas will be to complete and the task will be to produce the detailed design for a model subsystem and then undertake development. Having a good understanding of data base and writing some of the more procedural code, especially small item applications. Applications would therefore be preferred. Previous experience developing batch systems required with 2-3 years knowledge of COBOL and IMS DB/DC. The position is for 2-3 years and consultancy will be offered after.

For further details please contact our London office or call 01-236 7319.

**The European
370-Specialists**

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BASIC + CODER with DEC exp.
DOCUMENTOR with knowledge of BASIC
RPG11 Analysts + Programmers — IBM/ICL

HANTS

Systems Analyst with Assurance exp.
Cobol Programmers OS/VF1

KENT

PL1 Assembler Programmer

BRUSSELS

Cobol Programmer (Applications) with DEC exp.

HOLLAND

Systems Programmer IMS DB/DC

Contact: M. Doherty on

01-439 1856

dataScience 01-439 7871

SOFTWARE ENGINEERS WEST GERMANY

International company based in West Germany requires software and hardware engineers to develop computer-based visual-communication and digital telephone systems. Vacancies exist at all levels up to group leader for applicants qualified to degree or equivalent.

Successful applicants will have experience in real-time database applications and the ability to write and implement programs.

Excellent salaries and employee benefits are offered together with generous relocation expenses.

Apply in first instance to:

B.T.P. Ltd, 12 Shire End, Wellington, Shropshire, Tel: 0754-790123

GREATER GLASGOW HEALTH BOARD COMPUTER CENTRE SYSTEMS DESIGNER

£2,285-£2,685 PER ANNUM

This Board wishes to appoint an experienced Systems Designer, who will be required to lead and, where appropriate, supervise the work of systems staff engaged in the creation and maintenance of an ICL 1803-based computer system for financial and administrative applications.

Candidates should have around four years relevant experience and a good educational background for the post which is based at 27 Park Circus, Glasgow.

Application form and job description may be obtained from the Recruitment Officer, Greater Glasgow Health Board, 281, Alexandra Parade, Glasgow, G2 3HT, to Monday, August 11, 1980.

We are looking for experienced COBOL programmers, analysts and systems designers to develop our on-line inventory control system. The broad functional areas will be to complete and the task will be to produce the detailed design for a model subsystem and then undertake development. Having a good understanding of data base and writing some of the more procedural code, especially small item applications. Applications would therefore be preferred. Previous experience developing batch systems required with 2-3 years knowledge of COBOL and IMS DB/DC. The position is for 2-3 years and consultancy will be offered after.

For further details please contact our London office or call 01-236 7319.

F International
+ Flexitime

Covering Britain from its head office in Chelmsford, this subsidiary of the UK computer software house offers a unique method of working, mainly computerised in the industry.

For further information please contact:

Mrs. Penny Tuff
Director, F International
1000 London Road
Chelmsford, Essex
CM1 3JG
Tel: 0394 27 881

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EMS currently have a number of interesting vacancies for proven performers, with a small but technically experienced unit supporting a growing network of clients throughout the U.K. The centre's primary product is the Honeywell Level 8 series for which we have proven integrated systems available for real applications, offering unique marketing advantages. We are looking for salesmen with a good record of sales with EMS and beyond the investment capability of all but the leading manufacturers.

Our requirement now is for professional, experienced salesmen, capable of rapidly penetrating defined markets for our range of products. We are looking for proven performers with a good record of sales for Burroughs, IBM and Unisys. Distribution, Manufacturers, CIO, Leasing and Sales organisations and general commerce is required. Equally we have a need for senior level staff capable of taking territory control and eventually moving towards controlling entire regional teams.

We seek only experienced salesmen capable of selling a minimum of £200,000 worth of systems to a vast potential U.K. market. Our modularised software is currently in process of being converted to other leading manufacturers new systems offering to enhance our market opportunities and this is the ideal time to join our selected products under license to become a Burroughs, IBM or Unisys software house. We also have a range of Burroughs, IBM and Unisys sales and commission schemes available for top salesmen.

Consultant: John Wood — 0782 623666.

Analysts & Progs—Burroughs London

Negotiable salaries

A client dealing with Banking and Foreign Exchange Systems seeks a number of staff with Burroughs 61700 or 1800 Cobol experience in a commercial environment. Any package experience would be useful, as would be the ability to communicate with external software consultants developing systems on the client's behalf. Numerous positions are available for staff with relevant experience. Attractive salaries are negotiable.

Contact: Carol Atrek — 0782 623666.

ICL Analysts & Progs. Hull

£8,800 to £12,000

A large ICL user, currently developing under Osprey 2 and DME-2, has a number of urgent requirements for experienced ICL staff. Candidates must be educated to a minimum A-level and have an ICL Cobol or Fortran programming background. Owing to experience of working with a particular client, the client is well known and highly successful trading group dealing with U.K. wide systems. Candidates will join a small team of approximately 12 main Analysts and Programmers, working on the development of financial and commercial systems. At Hull staff will also be involved with the development of custom-built production systems and additional training will be provided. Opportunities exist equally for later moves into management.

Consultant: John Wood — 0782 623666.

IBM Systems Engineers

London

£0,000 to £10,000

Our clients are seeking a unique combination of skills and attributes relative to attract the right candidates. Experience in ICL 1803 or 1844, Assembler, OS/VS and CICS and CBL will be essential. The client is a large systems house in the planning and developing of specialised software with the real time transaction system. You will be a Technical Specialist, who will design and generate software and carry out programming. Duties will include the generation and maintenance of telecommunications, and associated software. You will be required to maintain and support in-house, real-time system, communications, where appropriate. You should have a minimum of 5 years' Assembler, and at least 2 years' CICS. Some experience of structured programming would be advantageous. Good standards experience will be important to ensure success working within a disciplined environment. The client is a major IBM user dealing in commodities within the city.

Consultant: Carol Atrek — 0782 623666.

IBM Project Controllers and Programming Controllers Merseyside

£7,800

Candidates should be capable of project planning and control, Project Controllers will carry out analysis and design, function building projects, with regular user contact, from initial conception to final installation. Education to graduate level is preferable.

Programming Controllers will be experienced in IBM ASL, and have a good working knowledge of COBOL or IMS. Any experience of mini or distributed processing would be particularly attractive.

The client is a sub-contractor to a major U.K. engineering group, and the post carries responsibility for a number of clients. The client is a major IBM user dealing in commodities within the city.

Consultant: Carol Atrek — 0782 623666.

Software Designers & Systems Programmers

Middlesex

£8,000 upwards + car

Our clients, a major Space and Defense Systems Manufacturer, have over 50 client vacancies for experienced systems consulting staff to join an expanding Turnkey Group based on our Birmingham Data Centre. Ability to co-ordinate team activities and to handle multiple system shipments, using existing modularised software to reduce development time.

The major emphasis during the 1980's will be that of rapid shipment from initial contract, and staged enhancement to existing software with other custom-built systems working within a fixed price environment. We are already looking at making an early contribution towards the white development. Current clients include Manufacturing, Electrical Groups, Printing Groups, the Potter Industry and Food Groups. We have our own in-house 2904 with 2 x 7502s and a variety of video.

A good pre-sale personality is essential as regular client contact is involved. We seek a neat and orderly working manner to ensure adherence to group standards. Ability to locate, forecast and plan is important as most of our work is based upon fixed price quotes, necessitating tight and meaningful controls.

All candidates must have undertaken at least 2 years' Cobol programming at some stage during their career. We seek applicants from training units, upwards prepared to work in a demanding environment and capable of working in a team. Travel to client sites is an important function as a driving license is essential. We offer a modern, informal working environment where promotion based upon results is encouraged for all group staff.

Consultant: Don Whibley — 0782 823666.

Project Managers Birmingham

North Staffs

Good Negotiable Salaries

We urgently seek experienced ICL 2003/4 Systems Designers and Analysts capable of taking design responsibilities for a small software team, working on customized development for a growing range of ICL clients throughout the U.K. The centre's primary product is the Honeywell Level 8 series for which we have proven integrated systems available for real applications, offering unique marketing advantages. We are looking for salesmen with a good record of sales with EMS and beyond the investment capability of all but the leading manufacturers.

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All candidates must have undertaken at least 2 years' Cobol and Algol knowledge using Burroughs hardware. A knowledge of MCP/GEMOS/ND/OS/311 would be advantageous.

2. Military and Communications projects requiring a knowledge of POP-11, DCN, Forran, GEC and Coral 86. Alternatively Assembly or Mins would be advantageous.

3. Programmers are required to work on pension systems for a major insurance company run on a large IBM mainframe. The applications make extensive use of database and transaction processing.

Numerous other vacancies exist throughout the U.K. Graduates are planned.

Contact: Carol Atrek — 0782 623666.

Senior Software Designers & Progs.

Hants, London, Cheshire

Up to £11,000

A major U.K. software group are currently seeking a large number of additional staff to work on a variety of different projects within group development centres. Examples of projects involved are as follows:

1. Initial designs of major command projects for the Police requiring Cobol and Algol knowledge using Burroughs hardware.

2. Military and Communications projects requiring a knowledge of POP-11, DCN, Forran, GEC and Coral 86. Alternatively Assembly or Mins would be advantageous.

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Numerous other vacancies exist throughout the U.K. Graduates are planned.

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Systems Analysts — Commercial Systems

North West

£5,000 packages

We are a number of vacancies within our systems consulting unit for experienced analysts to join our client support teams building large and complex applications systems under the contract and direction of client staff. Candidates with Stock, Accounting and Distribution experience are particularly welcome. The client is well known and highly successful trading group dealing with U.K. wide systems. Candidates will join a small team of approximately 12 main Analysts and Programmers, working on the development of financial and commercial systems. At Hull staff will also be involved with the development of custom-built production systems and additional training will be provided. Opportunities exist for later moves into management.

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Sales and Marketing Professionals

Modular Computer Services is a European leader in the supply of computer systems to the telecommunications and industrial marketplaces.

We are a young dynamic company with a rapidly expanding marketing and sales organisation and as part of this expansion we are looking for Technical Marketing Analysts and Sales Engineers to join our existing teams in Wokingham and Coventry.

Technical Marketing Analysts c £11,000 + Company Car

Suitable candidates will have a technical background on minis and will probably have held senior positions in projects implementing real time systems in industrial or communications applications. The right people will be enthusiastic, committed individuals capable of providing our sales force with comprehensive support. This role may suit software specialists with both assembler experience and proficiency in a high level technical language who are looking for the challenge of a demanding pre-sales environment.

Company benefits are excellent and include a non-contributory pension scheme, free Life Assurance and free BUPA.

For further information ring Sue Burden on Wokingham 788711 or write to Modcomp, Molly Millars Lane, Wokingham, Berks.

Sales Engineers c £16,000 + Company Car

We are looking for Sales Engineers with a proven background of successful selling within a minicomputer environment. They will preferably have a knowledge of communications or process control markets and the kind of drive and determination that will enable them to achieve commission of £6-£8k above target met. We expect to attract aggressive individuals capable of making a significant contribution to a sales organisation and who are looking to take on increased responsibilities in the future.

MODCOMP

IBM EXPERIENCE

MIDLANDS £7,000-£9,500 PLUS

Our client, a long-established Midlands consultancy wish to recruit further professional staff at all levels.

The opportunities merit strong consideration, as the organisation can offer a real career challenge, allowing individuals scope and variety. The company is of long standing, stable and carefully managed, they are embarking on a well planned expansion, particularly on the £100k and £300k ranges and so seek additional staff with IBM experience.

The various roles include programming, principally in PL/I and COBOL, systems design, project management and consultancy, working with experienced colleagues, and provide opportunities for personal advancement.

Experience of CICS, D/L/I, IMS, DMS, or QWICOS would be of particular interest, but is not essential.

The company has an friendly personal approach to clients and staff alike, and has generated an active social life. Benefits such as a monthly salary review and bonus, pension and sickness schemes, 6 weeks holiday, maternity allowances and expenses are attractive.

If you can offer IBM experience, and would like a confidential discussion, contact Mike Hessian ref CW 280.

COMPUTER PERSONNEL
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CPC

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(Ref. X.10)

Required to teach on a range of undergraduate, diploma and postgraduate courses in Computing. Applicants should offer specialisation in at least one of the following subjects: Programming, Theory & Methodology, Systems Programming, Programming in Structured Languages.

Salary: Subject to formal approval and review from 1st April 1980 (including of inner London Allowance). £7,000-£9,500.

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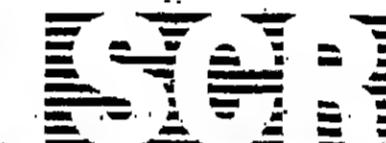
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C.£6,500 inc. 8/10 OPERATORS		HALEBOWEN	B842
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To £6,500	ANALYST/PROGRAMMER	WOLVERHAMPTON	B925
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To £7,500 + Rev. PROGRAMMER	OUDLEY	BB24	
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To £8,000	BUSINESS SYS. ANALYST	STOKE-ON-TRENT	B939
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C.£8,500	SYSTEMS ANALYST	MANCHESTER	BB36
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C.£8,000	PROGRAMMERS	MANCHESTER	BB35
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C.£6,000	PROGRAMMER	NORTHAMPTON	EM816
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C.£7,500	PROGRAMMER/ANALYST	NORTHAMPTON	EM831
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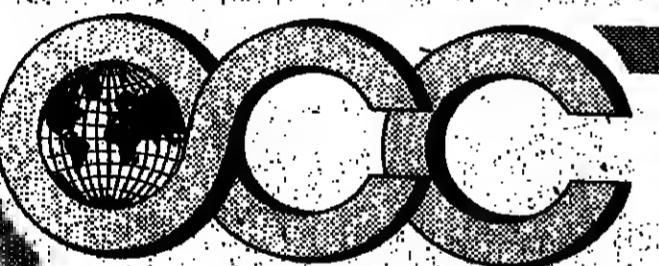
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The company is able to offer positions as Project Leader, Team Leader and Analyst/Programmer levels to high-calibre technicians and designers. Those who can offer expertise in multi-processor system architecture and/or advanced real-time programming methods will be ideal. The division itself has in-house access to a number of systems which include hardware such as INTEL 8086, Z100 80, MICRONOVA VAX1/780 and NOVA 3's. Candidates should have had experience in the relevant application areas, although good technical experience alone may well be of interest.

Contact: Margaret Stevens

Senior Analyst/Programmers

To £10,000 Package

E.C.1. Our client requires high calibre professionals to work on a variety of real-time projects using mini computers, as well as become involved with micro based packages and development.

A strong background in mini systems using a high level language is essential as is the ability to communicate with clients and technical staff at all levels. Some micro development experience is highly desirable.

This is a progressive forward looking software house offering excellent career prospects.

Contact: Brian Pontes

Communications Technicians

c. £9,000

We are currently recruiting experienced communication staff for our client who has just upgraded from ICL 1900 series to a 2900, which will eventually be configured to run on a 3/4 dual VM3/B machine, encompassing a large communications network with associated equipment.

A minimum of 12 months experience is essential, covering areas of design and cataloguing, fault diagnosis and implementation of communication software with exposure to VME/B support work in fields other than communications. This is an excellent opportunity to gain experience within a substantial communications environment, utilising the latest technology.

Contact: Janet Clifters

Analyst/Programmers

up to £8,500

London EC2 A very successful international organisation wishes to recruit several ANALYST/PROGRAMMERS to work in small teams to develop commercial on-line applications on an HP 3000.

Candidates should have three years programming experience together with some involvement in the design of systems. A background of minicomputers is obviously desirable, but not mandatory as training will be given where appropriate. Interesting and friendly environment.

Contact: Jim Baker

Programmer/Analyst

£7,500

City Our client, a medium sized insurance organisation, are in the process of installing their own mini computer, and need an experienced person to play a major role in the development of systems. Initially working very closely with the software house who are supplying the turnkey system, also liaising with the bureau which the company is currently using.

A minimum of two years COBOL preferably from a small machine environment, some programme design experience is essential.

The appointee will have every opportunity to develop within the company plus all benefits associated with a financial organisation.

Contact: Janet Clifters

COBOL Programmer

£7,500

Bristol Our client, a leading international computer services organisation, wishes to appoint a Programmer in one of their product support groups.

Applicants should have at least two years in commercial applications using COBOL and possibly ALGOL on IBM 370's or CL machines. Ability to deal with clients and solve user problems is essential.

Contact: Jim Baker

JAMES BAKER ASSOCIATES

International Personnel Consultants

32 Savile Row, London W1

Tel: 01-439 9311

FRANCE
MICROS

Programmers and Analysts
Programmers sought by International Software Group to work on PABX systems in
Paris and Germany. At least 4 years' software development
experience necessary, with electronics or similar background. Reasonable French required.

£16K

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Programmers with at least 8 months' COBOL experience, gained in a batch or on-line environment, for customer support team of Mini Micros, with a good knowledge of French required.

£6.5-8K

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SYSTEMS

Programmers with 2-3 years' COBOL or RPG II and keen to make a career in high level financial systems (mainframes and mini-frames) wanted by London (West End) office of International Financial Systems House. Excellent benefits package.

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GRAPHICS —
GERMANY

PPD II experience and knowledge of graphics required for recently opened German office of US company specialising in computer systems for publishing industry. German advantageous but not a pre-requisite. Long term prospects excellent as the company will be expanding and diversifying over the next few years.

£12-17K

CHESHIRE & HANTS

Senior Software Designers, Team Leaders and Programmers required for major command and control project — Burroughs large system experience essential with COBOL and ALGOL for programmers MCP/Gemcos/NDI/DMS I for designers. Minimum of 2 years' experience necessary — choice of locations in either the North West or the South.

£7-11K

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The Company: Market leaders in the field of Microelectronic technology, manufacturing microcomputer and semi-conductor products. The European Systems Division (based in the Western Home Countries) require additional expertise in the Marketing, Technical Support and Systems Analysis areas to consolidate and continue their outstanding performance.

Sales Engineers: to sell the company's range of memory systems and microcomputer systems. You should offer at least 3 years' experience in selling either high technology LSI semi-conductor or mini-computer products and have a good understanding of software backed by a professional qualification in Electronics or similar.

Technical Support: for memory systems and OEM Micros, to generate sales aids, conduct product analysis, sales training and demonstration programmes, etc. The positions require highly technically qualified personnel in the field of applications/development of micro systems. Software experience a definite advantage. Initial training in the US will be provided for successful applicants.

UK to £15K Europe to £25K



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to participate in a substantial information systems development embracing all activities of the BP Group Of Companies in New Zealand

Emphais is on developing —
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c/o Accounts & Control Dept
BP Trading Limited
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Tel 01820-7788/8957
(Reverso Charge)

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This opportunity will interest well educated, presentable and articulate individuals, who have had two or three years' programming experience, preferably including a period as a Systems Analyst or Analyst/Programmer. Career prospects are good, and there is plenty of development work.

We are recruiting on behalf of clients. Please ring or write, quoting ref: 880. Messages after hours will be recorded.

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IBM SYSTEM 34
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These are just a few of our current vacancies

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to DM 65,000 p.a.

We are an established systems house specialising in the real time application of mini computers to process control, communications and terminal based systems. Our German operation has built up an excellent reputation for high quality work which has led to an increasing demand for our services.

As such, we can offer excellent career prospects for software specialists to join our permanent staff. The work is varied and demanding and is mainly on a project basis where we take complete system responsibility.

The computers we are working on include

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Among the many benefits you will have working for an English company in Germany are:

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Patricia Hewitt, DAI Limited, Alpha House, 190 Kingsway, London NW1 2RR. Tel: 01-436 3122

Ray Stedman, DAI GmbH, Herkogicstr. 6, 6078 Neu Isenburg, N.R. Frankfurt, West Germany. Tel: 06102 38386

Saudi Arabia c. £11,000 tax free

Required for the Telephone Extension Project, which is operated and maintained by Bell Canada.

Applicants must have at least 1 year's Programming experience in COBOL, data base experience using MVS/VS and knowledge of IBM 3033. Will be required to code and test complex programs, assist in the development of systems feasibility, design programs and maintenance.

The positions are based in Royal Oak 1/2 — 2 year Bachelor status contracts will be offered, including free furnished accommodation, car, medical cover and 20 days paid UK leave every six months.

Telephone for an application form, quoting reference number, the Your Newton, London Recruitment Limited, Druga House, The Mall, London, EC3 5LS. Telephone No: 01-579 0291

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Analyst-Programmers

Saudi Arabia c. £11,000 tax free

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Applicants must have at least 1 year's Programming experience in COBOL, data base experience using MVS/VS and knowledge of IBM 3033. Will be required to code and test complex programs, assist in the development of systems feasibility, design programs and maintenance.

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Telephone for an application form, quoting reference number, the Your Newton, London Recruitment Limited, Druga House, The Mall, London, EC3 5LS. Telephone No: 01-579 0291

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THE SALES BIT

Persuasion is always better than force

ARE you sitting comfortably? Then I'll begin.

One day the North Wind and the Sun were arguing about which was the stronger. They were unable to agree and decided to devise a means whereby their argument could be settled.

Down in the world below, a man was walking along with a sack held firmly over his shoulders to keep out the cold of a less than temperate day. The North Wind decided that here was a perfect vehicle for proving his superiority. He therefore stated that he could remove the sack from the man's back more quickly and effectively than the Sun.

The man was shocked by the sudden arrival of a fierce and bitter wind that almost blew him to the ground, but he quickly adjusted to the unexpected assault, grasped the sack tightly, braced himself firmly and walked determinedly into the unrelenting blast. The harder the wind blew, the tighter he held the sack. The fiercer the assault, the more determined he became. Eventually the North Wind realised he was making no progress, at all, and agreed to let the Sun have a go.

The man was surprised by the sudden change in the weather as he had been by the arrival of the wind. The sky began to clear, the temperature rose, and very soon the man began to ease his grip on the sack and relaxed as he took off the sack, lay down under a tree and went to sleep.

The man in the story

wanted to be warm, not cold, and no manner of argument about the warmth of a post-douche glow was going to persuade him otherwise.

Back to Aesop: The moral is not simply a matter of force versus persuasion; it is also about identifying what people are seeking, what they need, what they want, what will make them happy — not inflicting upon them what one wishes them to have.

The man in the story

wanted to be warm, not cold, and no manner of argument about the warmth of a post-douche glow was going to persuade him otherwise.

I am sure this Aesop

Fable has appeared somewhere in the childhood of most readers, but its point would be just as relevant if it were to appear in the middle of a training course for salesmen or managers.

Whether the situation be a difficult negotiation, the administration of a difficult salesmen, the settlement of a dispute, or a person-to-person disagreement, one can always rely on aggressive tactics to

get the job done.

It is not simply a matter of force versus persuasion; it is also about identifying what people are seeking, what they need, what they want, what will make them happy — not inflicting upon them what one wishes them to have.

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INTERESTED? Phone or write to Mike Denney, Contracts Manager on 01-439 1856.

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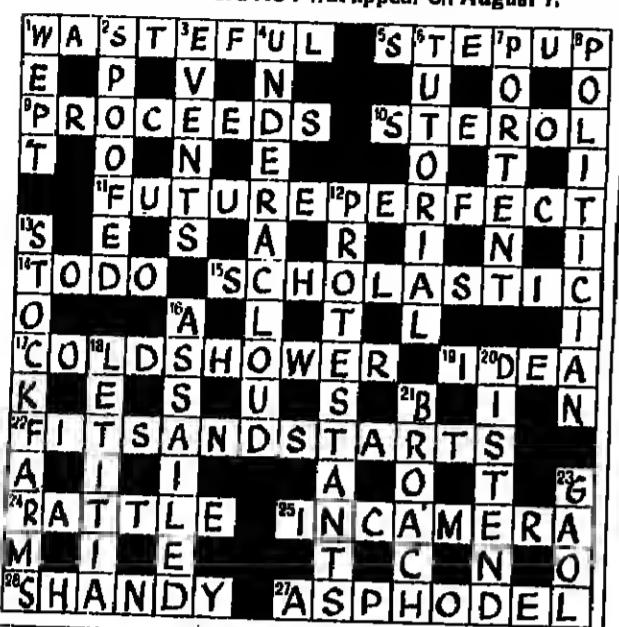
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CW Prize Crossword No 6**SOLUTION**

Winner of Computer Weekly Prize Crossword No 6 is Lawrence Owen of Portcawl, Glamorgan, who is a senior systems analyst with British Steel at Port Talbot. He receives the first prize of £10. Second prize of £5 each go to Chris Robinson of Ashhampton, near Reading, and Mike Harpin of Gloucester, a programmer analyst at RAF Inverness.

Prize Crossword No 7 will appear on August 7.

**University of Birmingham****Computer Centre-Systems Group Computer Officer**

The centre provides a wide range of interactive, batch and network facilities to the University. The Systems Group is involved in all aspects of the services. The Computer Officer will work in the graphics area on both the interactive and batch facilities. A range of graphic devices is available, including the commissioning of a new micro-controlled digitiser.

Applicants should have several years' proven experience in systems software. Previous experience in graphics would be advantageous. Higher degree is desirable.

Salary range £4,402-£7,410-£8,788 (under review) plus supernumerary.

Maximum starting salary will depend on experience and qualifications.

Further information from Assistant Registrar, (S.E.1), P.O. Box 363, Birmingham B18 2TT, to whom applications (3 copies), naming three referees should be sent by Friday, 22nd August, 1981.

Please quote reference CW.

**CONTRACTS PROGRAMMER**

Start beginning of August, Berkhamsted. Please contact: Dorothy Jones, Forces & Computer Services, 01-980 3761.

£1440.

FORCE 8 Computer services
8 Mint Walk Croydon CR0 3ZG

DUDLEY METROPOLITAN BOROUGH Dudley College of Technology**LECTURERS IN COMPUTING**

Two lecturers in Computing required to teach both Data Processing and Programming in IS/EC/TEG, Initial Programming (NCC), Threshold and TOPS courses. For a suitable candidate possessing good computing experience, there is the possibility of the post being a temporary L1 for three years. The other post will be L1.

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Further particulars and application forms from the Principal, Dudley College of Technology, The Broadway, Dudley, West Midlands DY1 4AS.

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Preferably experienced in the telecommunications field with basic PDP 11 and with good customer presence. Must be able to lead and motivate a small but effective project implementation team and derive satisfaction from achieving project time scales. The company is established and rapidly expanding in the growing Imsa/telecomms market. A prime opportunity for career development with a sterling salary of around:

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An experienced Analyst/Programmer is required to assist in the design, implementation and maintenance of computer systems within the University Administration and University Library. Salary will be on the Administrative Scale 1A or 1B (£4402-£8789 or £4402-£7410, both under review) depending on age and experience, with normal pension arrangements.

Administrative systems are based on an ICL 2903/30 and a GEAC 8000 will be installed in the Library in the near future.

The successful candidate will be expected to demonstrate the ability to work with a minimum of supervision. A knowledge of the RPII, Financial and/or Library systems would be an advantage.

Applications (3 copies) naming three referees, should be sent to the Registrar and Secretary, University of Durham, Old Shire Hall, Durham DH1 3LP, from whom further particulars are available. Closing date for applications 8 August, 1981.

20781

THE UNIVERSITY OF LEEDS UNIVERSITY COMPUTING SERVICE

Applications invited for a post of COMPUTING ASSISTANT in the University Computing Service. Applicants must have a good honours degree or equivalent, and some experience in a relevant field would be an advantage. The appointment is for a fixed period of 12 months.

The Computing Service is responsible for the provision of computing facilities to all departments within the University and has responsibility for the running of the Amstrad V700 workstations and the PRIME 7800 Computer. The successful applicant will be involved in work, primarily in the University Computing Group which develops, maintains and advises on the use of applications software.

Salary at an appropriate point on the 18 Scale for Office Related Staff, £4,402-£7,410 (under review), according to age, qualifications and experience.

Further details from: Mrs. J. M. G. Smith, Computing Services, The University, Leeds LS2 9JT, quoting reference number 48/2842. Closing date for applications, 21 August, 1981.

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ANALYST/PROGRAMMERS London IBM Cobol/PL/I/Mark IV

Mr. Roger Barnes Tel: 01-589 1408
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£1440.

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Fixed hours in operation. Disbursement and separation allowances and 300% removal expenses payable in appropriate cases.

Application form and job description obtainable from Personnel Officer, Council Offices, Knowle, Stourport-on-Severn, DY10 8BB. Tel: 039 8581 3426, 3427 (24-hour answering service). Closing date 11 August, 1981.

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Further particulars and application forms from the Principal, Dudley College of Technology, The Broadway, Dudley, West Midlands DY1 4AS.

New site—New systems—New challenges for Analysts and Programmers**In Milton Keynes**

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A minimum of 2 years programming experience on real time minis is required. We offer a new language, a variety of hardware, and a range of applications.

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Further particulars and application forms from the Principal, Dudley College of Technology, The Broadway, Dudley, West Midlands DY1 4AS.

Senior Computer Operators**required at Culham Laboratory**

(sited 10-12 miles from Oxford in attractive Thames Valley Countryside)

Additional staff are needed to operate ICL 2976, ICL 470 and Prime 500 computers on a shift basis. Previous operating experience on 2176 or Prime is preferred.

Pay: In the range of £4740-£5580 per annum for the grade of Senior Data Processor.

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Hostel Accommodation: For single people applying from outside the area and possibly for married applicants too while arranging housing locally.

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Please complete the coupon or phone for an application form to: Mrs Sheila Taylor, Personnel Department, UKAEA, Culham Laboratory, Abingdon, Oxon OX14 3DB. Tel: Abingdon 21840 Extension 6399 or 297

Please send me an application form for Senior Computer Operator.

Name: _____

Address: _____

SW 7074

Culham Laboratory

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LIFE ASSURANCE CONSULTANTS/ANALYSTS

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WE REQUIRE:

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- 3) Actuarial or valuation experience would be an advantage but is not essential.

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70 Borough High Street, London SE1 1XF
Tel: 01-403 3456 1568 24-Hour Answerphone

The Director, Dept. ZA4, Oxford Business School, 66 University Road, Oxford, OX2 0EL, Tel: 0808 64231, 24 hrs.

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WILCOX COMPUTERS are looking for

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An all areas throughout the UK to sell their highly successful British manufactured small business system.

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Mr. R. OWEN, SALES DIRECTOR
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Young Programmer/Analyst

to join Design Team — London

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PL-1 Applications Programmers

Belgium: Salary £20K

A European Systems and Software Supplier with a Regional Headquarters in Brussels is seeking several PL-1 Applications Programmers for six month and one year contracts. All candidates must have PL-1 programming experience amounting to 2 years or more in a Database (IMS) and Teleprocessing (CICS) environment. Applications experience should have in:

Ref: L/30/A

Real-Time Applications

Greater Manchester: Salary to £10K + Benefits

A well-established Systems House specialising in the supply of Industrial Processing and Control Systems requires Real Time Programmers for its Manchester office. Applications with at least one year's real-time experience and/or experience in developing real-time systems will be considered for these demanding career positions. You will be offered the opportunity of involvement in all stages of software and systems design and implementation. Fluency in either Assembler or BASIC is essential. Preference will be given to those who have worked with a manufacturer or systems supplier. Familiarity with the systems supplied by Companies such as Ford, Kermi or Ferranti is a further advantage. There are ample opportunities for both national and international travel.

Ref: L/30